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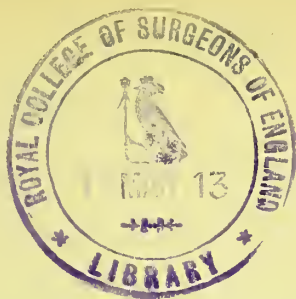
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## REPORT ON THE SKELETON FOUND NEAR WALTON-ON-NAZE

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England.

AN examination of this skeleton brings one face to face with the difficulties which may be encountered in the recognition of sex. When Mr. Warren brought the skeleton to me I at once said that the skull was that of a woman, but when he directed my attention to the pelvis I at once admitted my error, for the characters in it were overwhelmingly of the male caste. When alluding to the characters of this skeleton in my Hunterian lectures, I spoke of them as male, regarding the skeleton as a representative of the slim young man of short stature and delicate features a type which is plentifully represented in every branch of modern civilized life. It was only when I came to write out a full description of the skeleton that I observed that at every point, except as regards the pelvis, that I had to admit the parts were those of a young woman not those of a man. Lately I have had occasion—owing to the pelvis of an individual who had passed through life as a woman, but who was found at death to have the imperfect parts of the male, being presented to the College of the Museum by Dr. Arthur Davis—to examine more minutely than I had done before the various characters which one looked on as characteristic of the male and of the female. There can be no doubt that in the case of the pelvis, as in the case of the skull, there is a percentage of individuals—perhaps three or four per cent. as regards the pelvis—more as regards the skull—in which the sexual features are so ill marked that it is impossible to assign the sex with any degree of certainty. This appears to be the case as regards the Walton-on-Naze individual, for in skull, in proportions of the body, in the configuration of the limb, bones, and ribs, especially in the form of sternum, the characters of the typical female are shown. I am therefore compelled to regard the skeleton here described as an example of the narrow-hipped, slender woman which one can see not unfrequently in England to-day.

### THE CHARACTERS OF THE PELVIS.

One feature of women is the breadth of the pelvis and hips in comparison to the breadth of their bodies and chests. In this case, having all the vertebrae and ribs, the greatest width of the thorax, at the level of the seventh pair of ribs can be estimated; it is approximately 200 mm., the width of the pelvis from iliac crest to iliac crest is 243 mm.; the width of the pelvis as regards the width of the thorax is that of a woman. In the male the diameters are equal or the thoracic is the greater.

The main character of the woman is the size of the diameters of the true

pelvis; they should be large enough to allow an easy passage to the head of the child at birth.

One must take into consideration the upper margin of the pelvis or inlet, and the lower margin or outlet. Nothing can be inferred from the absolute diameters of the inlet; they are frequently as large in the male as in the female. In this case they are small, even for a male—the front to back diameter (conjugate) is only 85 mm. (an average male = 100, average female = 112); the side to side diameter (transverse) is 118 mm., in an average male it is 125 mm., in a female 131 mm. I do not think the inlet would permit the passage of the head of a normally sized child.

Although small, the transverse diameter of the inlet bears the proportion to the breadth between the iliac crests that one finds in women. The transverse diameter of the inlet is—in the typical male 45·5 per cent. of the bi-crestal diameter, and 47·5 per cent. in the typical female: in the skeleton under description it is 48·5 per cent.—a well-marked female feature.

To allow the passage of the child, the outlet of the pelvis has to be large; its transverse diameter in the typical male is 70 per cent. of the inlet; in the female 90 per cent.; in this case it is 71 per cent.—a male character.

Then, again, the female pelvis is squat and shallow; its total breadth is 126 per cent. of its total height in the male, 139 per cent. in the female; in this case it is 128—a male character. Above all this pelvis has the male feature of an extremely small sacro-sciatic notch—the size of the notch depending on the growth of the ilium to form a roomy inlet to the pelvis for the passage of the child. The width of the notch, measured from the posterior inferior iliac spine to the ischial spine is only 50 mm.—a typical female may be double this size; the depth of the notch is 32 mm. On the other hand the preauricular groove is present, and that is usually regarded as a character of the female. The sacrum is 107 mm. long by 100 wide; the proportions are distinctly those of the male.

Another feature of the typical female pelvis is seen in the sub-pubic arch, for this has to be wide to allow the passage of the child's head and its rami or boundaries are more slender and thinner than in the male, in whom these parts have to be strengthened and thickened for the attachment of the male organ. The characters of the pubic arch are rather female than male in character in the Walton-on-Naze pelvis; the pubic rami show impressions for an organ shaped as the clitoris rather than for one with the size and form of a penis; the arch is moderately wide—62 mm. wide at a distance of 45 mm. below the symphysis—not so wide as in a typical female, but wider than in a typical male. Taken altogether the pelvic characters are those of the male, and yet there are features which tend decidedly to the female form.

#### THE STERNUM.

The form of sternum seen here I have only observed in the body of a woman; never in that of a man. The manubrium or upper part of the sternum, is 47 mm.



long by 50 mm. wide; the body, blade, or meso-sternum, is only 66 mm. long by 26 mm. wide. In males the length of the manubrium to the blade is usually as 1 : 2, in the female as 1 : 1·6–1·8; here it is as 1 : 1·4—ultra female.

As the further description is read—the short arms, the short span, the long body, high head and short neck, the relatively short lower limbs with the middle point of the body well above the symphysis pubis—the female characters are so predominating as to convince one that this Late Neolithic or Early Bronze individual represented a condition which gynæcologists have to contend with amongst modern women.

#### ATTACHMENT OF SKULL TO NECK.

The slender and fine modelling of the bones are certainly female. So especially is that part of the base of the skull which gives attachment to the neck. This area, shown in the profile of the skull, Fig. 1, is shaded. In an average

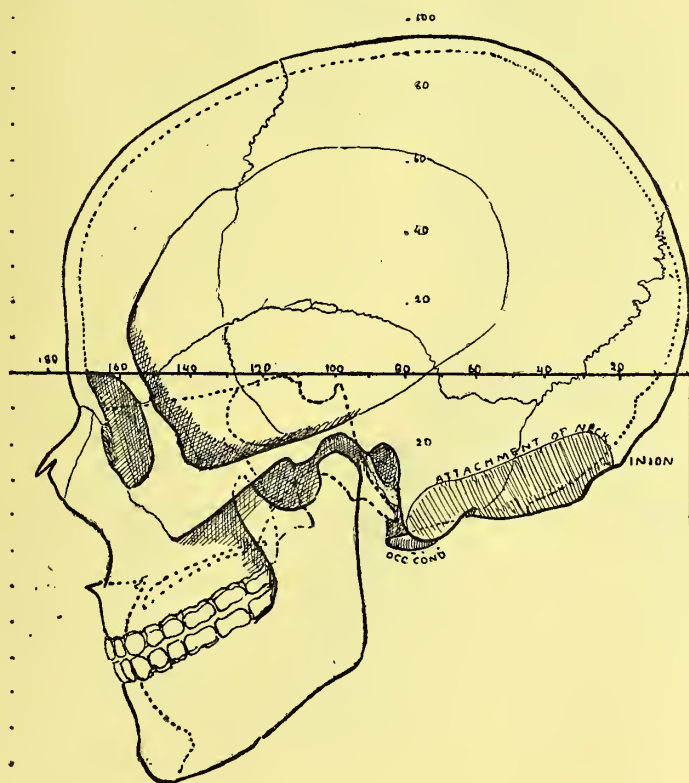


FIG. 1.—Profile of Walton-on-Naze skull (half natural size). The outline of the cranial cavity is represented by a stippled line. The skull is oriented on the sub-cerebral plane, indicated by t'a line.

Englishman this area is 80 mm. from back to front—measured in the profile of the skull from the inion or occipital protuberance to a line joining the anterior border of the mastoids; here, as in a typical woman, it is 60 mm.; the width in the

male (the bimastoid diameter) is 125–130 mm.; here it is 115 mm., a measurement usual in the female. The oval face, the characters of the forehead, the thin cranial bones, the maximum diameters of the skull, situated well above the level of the ears, all indicate the female.

#### AGE. STATURE.

The age is probably between twenty-five and thirty years; all the growing ends have joined the shafts of the bones; the sutures of the cranial vault are freely open on the inner and outer aspects; the bones are thin, varying from 3–4·5 mm. in thickness; the first molar is worn so as to expose the dentine on the crown of the first molar; the dentine is appearing at the tips of the cusps of the second molars, while the upper third molars are but little worn; the third lower molars begin to show dentine at the apices of the cusps.

The stature I estimate at 1629 mm. (5 feet 4 inches), and is made up as follows:—

Height of skull from condyles to—

	mm.
Highest point of vault ... ..	= 152
Cervical part of spine ... ..	= 110
Dorsal part of spine ... ..	= 285
Lumbar part of spine ... ..	= 170
Pelvic height from acetabulum to level of body of first sacral vertebra ... ..	= 60
Femur ... ..	= 420
Tibia ... ..	= 360
Astragalus and os calcis (height of foot)... ..	= 72
	<hr/>
	1,629 <sup>1</sup>

#### HEAD FORM.

As regards the head form, only the chief measurements are given, for it will be possible to obtain from the two accompanying drawings all details relating to the shape, size, and proportions, of the several parts. Some explanation of the drawings is necessary. In the drawing of the lateral aspect the interior as well as the exterior of the skull is represented. The skull is oriented on the sub-cerebral plane, which corresponds to the upper surface of the presphenoid in the anterior part of the skull, and to the attachment of the tentorium to the posterior inferior angles of the parietal bones in the back part of the base. In reducing the drawings to half natural size by a pantograph, a slight error has been introduced in the length of the skull (it is shown as 178 in place of 176). In the full face view the plane of orientation is the same as for the side face.

The cubic capacity of the cranial cavity is 1260 c.c.; the maximum length is 176 mm. (occipital projection to frontal eminence); the length from occiput to

<sup>1</sup> The internal malleolus is also included = 12 mm. This ought to be deducted.

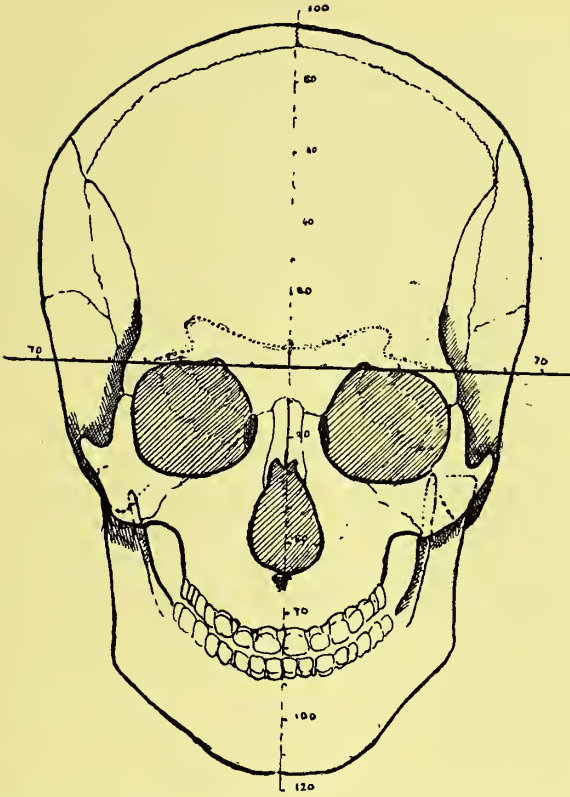
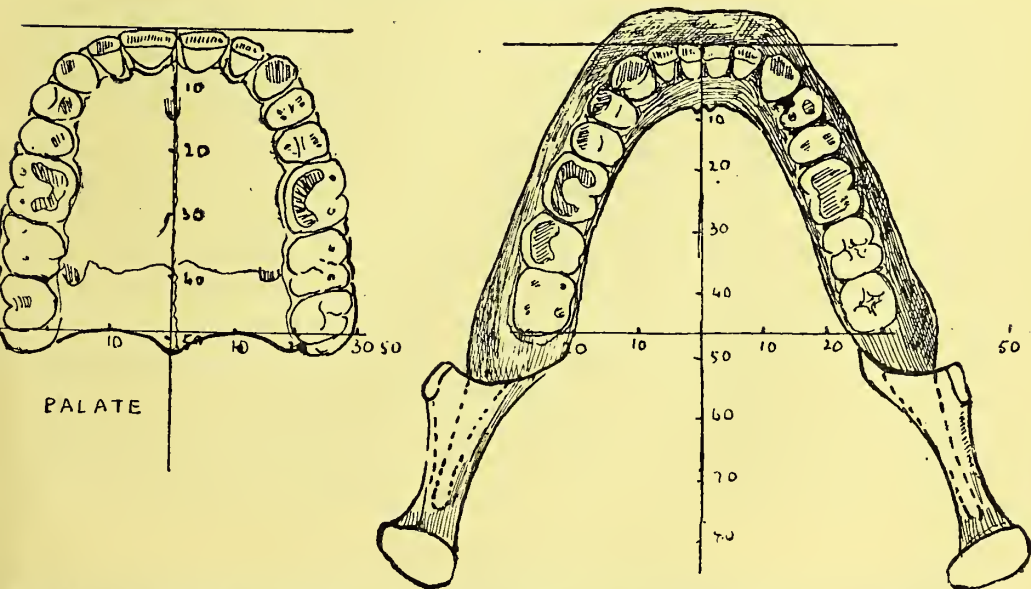


FIG. 2.—Full-face view of the Walton-on-Naze skull oriented on same plane as Fig. 1. The mastoid processes are indicated (half natural size).



FIGS. 3 AND 4.—The palate and mandible of the Walton-on-Naze skull. The degree of reduction is shown by the centimetre measurements. The mandible was oriented on the plane marked by the chewing face of the teeth.

glabella is 173.5 mm., frominion to glabella 158 mm. The short inio-glabellar length, the much longer occipito-frontal length, are in the proportions which one expects to find in a woman's or a boy's skull, not in an adult man's. The greatest width of the skull is 137 mm., and is situated near the parieto-squamous junction; the upper parietal width is 135; the binnastoid width 115 mm. The relatively small binastoid is a character of the female or of the boy. All these measurements are small—much below the mean for Englishmen. The maximum width is 77.8 per cent. of the maximum length. The forehead is comparatively narrow (85 mm.), although high and prominent. The height of the vertex of the skull above the auditory meatus is 116 mm.; its height above the sub-cerebral plane, 96 mm.; basi-bregmatic height, 133 mm.

#### THE FACE.

The shape and proportions of the face are also feminine, the upper face length is 65 mm.; the total face length (naso-mental) 107; the bizygomatic diameter 116; between the angles of the mandible 95. The face was thin, oval, and of rather small proportions. The muscular processes are developed to rather less than a medium extent. The frontal eminences are distinct; a transverse shallow groove on the forehead separates the eminences from the supra-orbital and supraciliary processes, which are very moderately developed. The infra-orbital (canine) fossæ on the superior maxillary are deep and wide depressions; the mental eminence is moderately developed. The exact development of the various structures mentioned may be estimated from the drawings.

#### TEETH, PALATE, AND MASTICATION.

The size of the teeth and palate may be estimated from the exact drawings given in Figs. 3 and 4. The incisors meet exactly in an edge-to-edge bite, not in the scissors-like bite of most modern Europeans, where the lower incisors pass up behind the upper. It is clear that in mastication there was a free side-to-side movement, the grinding surface of the lower teeth being drawn across those of the upper. The teeth of the left side are more worn than those of the right. In life, all the teeth were present and free from disease. The palate is flat and well-developed, the vault rising 15 mm. above the grinding level of the molar teeth. Although absolutely small, the palate is relatively large to the rest of the face. The size, shape, and width of the palate, of the mandible, and of the teeth may be seen in the accompanying drawings. In the upper and lower molar series the teeth diminish from the first to the third. The shape and size of the palate, and the manner in which the teeth are worn, are altogether unlike what is seen in modern English mouths, and if they do not assist us to fix the date of the skull, at least serve to assure us that it is not modern.

#### THE ORBITS AND NOSE.

The face is narrow, and hence the width of the orbits is about equal to their height (33 × 33 mm.), the right orbit being slightly the wider. The nose is



extremely prominent and narrow—a consequence of the oval type of face. The width of the nasal aperture—defined by a sharp margin of bone as in modern crania—is 22 mm.; its height (nasion to subnasal spine) 53 mm.

The point of the bony nose projects 33 mm. in front of the outer margin of the orbit (*see* Fig. 1) and 25 mm. in front of the infra-orbital margin. Prominence of nose can be thus recorded—perhaps more accurately than by any other method. A narrow, prominent nose is usually regarded as a sign of modernity. The prominence is not due to an outgrowth, but to a retrogression of the masticatory parts of the upper jaw and molar.

#### BONES OF THE UPPER LIMB.

The type of bone is that seen in people who live indoor lives, slender, well-formed, with moderately marked muscular impressions. The total length of the right arm is 686 mm., being made up as follows: humerus 293, radius 225, hand 168. The clavicles measure together 269 mm. (right 133, left 136), and the distance from the tip of one shoulder to tip of the other may be estimated at 215 mm. The span of the arms was probably about 1,580 mm.—49 mm. less than the stature. It is possible that the spinal length of the body may have been somewhat over-estimated, but, on the other hand, women have a span relatively short to their stature. The ulna measures 245 mm. (right), 243 (left). The right scapula measures 146 mm. from the upper to the lower border at its vertebral base, and 90 mm. from the margin of the glenoid cavity to the vertebral border opposite the base of the scapula spine.

#### EVIDENCE OF RIGHT HANDEDNESS.

There is a marked specialization in the right arm, seen especially well in region of the shoulder joint. The posterior border of the right glenoid is thickened and rounded. The axillary border of the scapula is 15 mm. in breadth (10 mm. on the left); the acromial end or epiphysis of the right scapular spine has remained free; it has united in the left; the total length of the scapular spine is 131 mm. in the right by 23 mm. at its widest point, while the corresponding measurements on the left are 127 × 21 mm. On the other hand, the distance from the glenoid cavity to the vertebral border is 94 mm. in the left as compared to 90 on the right. The left clavicle is 3 mm. longer than the right, but the right is the stouter if shorter bone. The measurements and diameters of the head of the right humerus are 3 to 4 mm. greater than of the left, and this is also true of the length and thickness of the shaft and area of muscular insertion (shaft of right at deltoid impression = 20 mm). The difference in the bones of the right and left forearm and hand is less marked.

Ulna, 245 right, 243 left.

#### BONES OF THE LOWER LIMB.

The total length of the right femur is 417 mm. (the left is more, 423), the right tibia 359 (left 358); the height of the foot 72 mm. In estimating the height

of the lower limb 12 mm. must be deducted for the internal malleolus of the tibia : total height of right lower limb = 836. The mid point of the body is thus situated about an inch (24 mm.) below the upper level of the hip joints, or in the natural position of parts, about 30 mm. above the symphysis pubis—a normal or average position for a woman. The femur is a slender but well-modelled bone, not flattened in its upper third as is so common in the neolithic man. The diameters of the shaft in the upper third are 27 (transv.)  $\times$  21 (antero-posterior): in the left bone, 26  $\times$  21; in the middle of the right shaft these measurements are 21  $\times$  24; left shaft, 21  $\times$  25. The extreme breadth of the lower extremity is 77 mm. on the right, 76 on the left. The diameters of the head 44  $\times$  44; the shaft is strong bent, convex forwards. The depth of the concavity is 35 mm.

The tibiae are of almost equal length—right 359; left 358. Opposite the nutrient foramen the shaft measures 30 (antero-posterior diameter)  $\times$  20 transverse, and is there flattened, but not markedly so. The posterior border of the upper third of the shaft carries the origin of the soleus muscle.

The total length of the foot, allowing 15 mm. for the missing middle and terminal phalanges, is 205 mm.—a foot of small dimensions with highly developed arch; the great toe, one may judge from the articular head of the metatarsal bone, was certainly not turned outwards as in races addicted to boots, but markedly inwards as is seen often in barefooted tribes.

#### THE THORAX.

The ribs are well but rather delicately modelled. The chest at the level of the lower end of the sternum I estimate, from the size and bend of the ribs, to have been 200 mm. wide by 130 mm. back to front; a relatively wide and rather flat chest. The sternum is in the usual three parts. The manubrium is 47 mm. long by 50 mm. wide, the meso-sternum 66 mm.  $\times$  26 mm. In size and proportion the thorax and sternum are those of a woman.

#### QUESTION OF RACE.

It seems futile to discuss the race to which this individual belonged, for to-day women showing the same size of body, the same form of face, the same diameters of the head, can be seen plentifully in our modern population. In Mr. Parsons' report on the Rothwell crania there are several which show the same proportion of cranial measurements. All we can infer from this find is that the racial type found at Walton-on-Naze persists to-day; the origin and derivation of the type needs much more research and more evidence as to the distribution of race forms in ancient Europe.

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